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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

	Application No.	Applicant(s)
Office Action Summary	10/760,967	IWASAWA ET AL.
	Examiner	Art Unit
	Albert H. Cutler	2622

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>09 July 2007</u>.

2a)☒ This action is **FINAL.**   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle,* 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

   4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

   Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   a)☐ All   b)☐ Some * c)☐ None of:

   1.☐ Certified copies of the priority documents have been received.

   2.☐ Certified copies of the priority documents have been received in Application No. _____.

   3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

   * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☐ Information Disclosure Statement(s) (PTO/SB/08)
   Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
   Paper No(s)/Mail Date. _____ .
5)☐ Notice of Informal Patent Application
6)☐ Other: _____.

DETAILED ACTION

1.   This office action is responsive to communication filed on July 9, 2007.

Response to Arguments

2.   Applicant's arguments filed July 9, 2007 have been fully considered but they are

not persuasive.

3.   Applicant argues, "Wilder '871 fails to teach or suggest a range specifying portion

for determining the density of signal spacing." Applicant further argues, "In other words,

because the rows or columns are adjacent, there is no determination of the density of

signal spacing, as taught and claimed by Applicants. This is different from the present

invention in which the selection signals are sent only to pixels that have been selected

in accordance with the density of signal spacing specified by the range specifying

portion."

4.   The Examiner respectfully disagrees. Consider page 13, lines 25-34, figure 5, of

the current invention, Applicant recites, "In the case of reading the region 504 of the

pixel portion 501 at increased resolution, the horizontal selection signals 514c to 514g,

of the horizontal selection signals 514a to 514j, corresponding to the region 504 to be

read out with increased resolution, are set to a **high signal spacing density**. Areas

that are not included in the region 504 are read out with the resolution lowered to one

half, and thus the horizontal selections signals 514a to 514b and 514h to 514j are set to

a **low signal spacing density**. At this time, pixels of the same color component that are

disposed at the periphery of the pixels in question are read out at the same time and

are mixed by the pixel signal read portions." From figure 5 of the current application,

one can clearly see that all the pixel signals are read out, including those from a high

resolution portion(504), and those from a low resolution portion(exterior of 504). Signals

from the high resolution portion(504) are read out individually, and signals from the

periphery of the high resolution portion are read out together and mixed. Applicant, as

shown above, refers to these two operations as having "high signal spacing density"

and "low signal spacing density", respectively. Therefore, based on Applicant's

specification, the Examiner gives this same interpretation to the Wilder et al. reference.

5.   Similar to Applicant, Wilder et al. teach that pixels from a low resolution area of

the imager are mixed(column 5, lines 5-22, column 6, lines 12-44), thereby producing a

low signal spacing density. More than one element per row and/or column are read out

at a time(column 6, lines 19-39). As there is only one signal needed to read out every

2, 4, 8, etc. pixels as one mixed pixel, the signal spacing density is lowered in the same

way as shown by Applicant's "Non-dense" regions of figure 5. Furthermore, as to the

notion that the imaging element taught by Wilder et al. would still require a large

memory in contrast to the imaging element taught by Applicant, the Examiner refers to

column 6, lines 48-64 of Wilder et al. "High-speed data acquisition" can be

accomplished by starting the image sensor in a mode wherein one mixed pixel signal is

read out for every 64 pixels. A region of interest of the image can be identified and that

region can be read out at a higher resolution, with the rest of the imager remaining in a

low-resolution state. Therefore, the charges of every pixel would not have to be stored

in memory, and thus the memory size requirements are greatly reduced. The method

taught in column 6, lines 48-64 of Wilder et al. also corresponds to a range specifying

portion as a region of interest(i.e. range) is determined.

6.   Therefore, the Examiner is maintaining the rejection.

Claim Rejections - 35 USC § 103

7.   The text of those sections of Title 35, U.S. Code not included in this action can

be found in a prior Office action.

8.   The Examiner's response to Applicant's arguments, as outlined above, is hereby

incorporated into the rejection of claims 1-8 by reference.

9.   Claims 1-3, 6, 7, 9-11, 14, 15, 17-19, 22, and 23 are rejected under 35 U.S.C.

103(a) as being unpatentable over Wilder et al.(U.S. Patent 5,262,871) in view of

Koizumi et al.(U.S. Patent 7,015,964).

Consider claim 1, Wilder et al. teach:

A MOS solid-state imaging element(image sensor, 10, figure 1, column 4, lines

45-48, column 10, line 57 through column 11, line 7) having a photodiode(P.D., figure

5A) for each pixel(figure 5A is a pixel), comprising:

a range specifying portion for determining a density of a signal spacing between

selection signals for selecting pixels to be read out according to a range in which a

resolution is to be different in an image and a resolution of the range(See column 4, line

54 through column 5, line 22. A processor/computer supplies supervisory signals(i.e.

range specifying signals) which control the readout of the image sensor(i.e. control

selection signals). The supervisory signals "determine which pixel signals and how

many pixels signals are read out at any one time". The supervisory signals also

"determine whether the pixel signals from a particular region are read out individually or

combined into superpixel signals(i.e. determine a density of the signal spacing in the

pixel readout)". The whole array or only particular areas of the array(i.e. ranges of the

array in which the resolution is to be different in an image) may be selected for readout

at different resolution levels. The supervisory signals determine the resolution at which

a range of an image signal is read out by either reading out all the pixels, or combining

groups of pixels into superpixels. Any portions(i.e. ranges) of the array can be scanned

at low resolution(maximum superpixel size) or at the highest possible

resolution(individual pixel signals), column 3, lines 23-28.); and

a selection portion for sending the selection signals only to pixels that have been

selected from among all of the pixels by outputting the selection signals in

correspondence with a specification from the range specifying portion(Supervisory

signals control the sensor readout(i.e. control selection signals) and determine a

region(i.e. range) of pixels which are scanned, reading out only selected pixels in a

determined range(i.e. select only pixels within a range specified by the supervisory

signals), column 5, lines 1-22. Other ranges can be read out as superpixel signals(i.e.

groups of pixels combined).);

wherein the pixel to which a selection signal has been input outputs, as a pixel

signal, a charge that has accumulated in the photodiode of that pixel(Row and column

selection signals are provided to the pixels, and each pixel in turn reads out a charge

accumulated by the photodiode, column 10, line 60 through 11, line 32.).

However, Wilder et al. do not explicitly teach that each pixel has an amplifier, or

that the amplifier of each pixel outputs the pixel signal accumulated by the photodiode.

Koizumi et al. is similar to Wilder et al. in that an MOS device is used(column 1,

lines 21-33) as an image pickup device(column 4, lines 47-54), and photodiodes are

used to convert light into electricity(column 4, lines 55-61). Koizumi et al. also teach

that selection signals are used to read out pixels(column 5, lines 1 and 2).

However, in addition to the teachings of Wilder et al., Koizumi et al. teach that

each pixel(figure 1) has an amplifier(Q3), and that the amplifier(Q3) of each pixel

outputs the pixel signal accumulated by the photodiode(column 4, line 55 through

column 5, line 2).

Therefore, it would have been obvious to a person having ordinary skill in the art

at the time of the invention to connect the individual pixels taught by Wilder et al. to

amplifiers as taught by Koizumi et al. for the benefit of producing a larger, easier to work

with signals, and reducing chip size by integrating the pixels and amplifiers

together(Koizumi et al., column 1, lines 21-33).

Consider claim 2, and as applied to claim 1 above, Wilder et al. further teach of a

memory portion storing in advance a range in which a resolution is to be different in the

image and a resolution of that range(A processor/computer analyzes previous data

transmitted(i.e. acts as a memory portion) from the image sensor to determine(i.e. store

in advance) the range in which a resolution is to be different in the image and a

resolution of that range, column 4, lines 57-62. This processor/computer then provides

supervisory signals to control the resolution and range in which the resolution is

different(see claim 1 rationale).)

Consider claim 3, and as applied to claim 1 above, Wilder et al. further teach that

the range in which a resolution is to be different in the image and a resolution of the

range, which are specified by the range specifying portion, are dynamically changed

from the outside("The supervisory signals may be generated by the processor/computer

pursuant to predetermined pixel readout instructions supplied to the processor/computer

through conventional input devices(i.e. dynamically changed from the outside).").

Consider claim 6, and as applied to claim 1 above, Wilder et al. further teach that

when outputting image signals to the outside, information expressing a range in which a

resolution is to be different in the image and a resolution of the range are added to the

image signals before they are output(The computer/processor provides the supervisory

signals with address signals(i.e. range and resolution signals) for the pixels to be read

out(see figure 1, "Address and Resolution Level Control", column 4, line 67 through

column 5, line 22). These pixel signals are then read out to the computer/processor(see

figure 1). Because the computer/processor already has address information for the

pixels it then receives from the image sensor, information expressing the range in which

a resolution is to be different in an image and a resolution of the range are added to the

image signals before they are output.).

Consider claim 7, and as applied to claim 1 above, the combination of Wilder et

al. and Koizumi et al. teaches an imaging device(Wilder et al., figure 1) comprising the

MOS solid-state imaging element according to claim 1(Wilder et al., "image sensor", 10,

figure 1, see claim 1 rationale).

Consider claim 9, Wilder et al. teach:

A MOS solid-state imaging element(image sensor, 10, figure 1, column 4, lines

45-48, column 10, line 57 through column 11, line 7) having a photodiode(P.D., figure

5A) for each pixel(figure 5A is a pixel), comprising:

a plurality of the pixels arranged in a matrix(See figure 2);

horizontal read portions(X_1, X_2, ...X_{512}) provided for respective columns of the

pixels(see figure 2), each horizontal read portion(X_1, X_2, ...X_{512}) being connected to

pixels in each column so as to be capable of reading out pixel signals from the pixels in

the respective columns(column 5, lines 25-54);

a horizontal selection switching circuit(output readout section, 16, figure 2) for

switching and outputting the pixel signals read from the pixels by the horizontal read

portion(X_1, X_2, ...X_{512}) for each column(column 4, lines 51-54);

a horizontal selection circuit(column decoder, 14, figure 2) connected to the

horizontal read portion(X_1, X_2, ...X_{512}) and outputting horizontal selection signals for

selecting, for each column, the pixel signals of pixels to be read out(column 4, line 67

through column 5, line 64);

a horizontal range specifying circuit(18, figure 1) connected to the horizontal

selection circuit(14, see figure 1) and determining density of a signal spacing of the

horizontal selection signals(See column 6, lines 48-64. Pixels from a low resolution

area of the imager are mixed(column 5, lines 5-22, column 6, lines 12-44), thereby

producing a low signal spacing density. More than one element per row and/or column

are read out at a time(column 6, lines 19-39). As there is only one signal needed to

read out every 2, 4, 8, etc. pixels as one mixed pixel, the signal spacing density is

lowered in the same way as shown by Applicant's "Non-dense" regions of figure 5.

"High-speed data acquisition" can be accomplished by starting the image sensor in a

mode wherein one mixed pixel signal is read out for every 64 pixels. A region of interest

of the image can be identified and that region can be read out at a higher resolution,

with the rest of the imager remaining in a low-resolution state. Therefore, the charges

of every pixel would not have to be stored in memory, and thus the memory size

requirements are greatly reduced. The method taught in column 6, lines 48-64 of

Wilder et al. corresponds to a range specifying portion as a region of interest(i.e. range)

is determined. See also, column 4, line 45 through column 6, line 44.);

a vertical selection circuit(row decoder, 12, figure 2) connected to each row of the

pixels(see figure 2) and outputting vertical selection signals for selecting the pixel

signals of pixels to be read out for each row(column 5, lines 23-54);

a vertical range specifying circuit(18) connected to the vertical selection

circuit(12, see figure 1) and determining a density of a signal spacing of the vertical

selection signals(See above rationale. As a region of interest is selected to be read out

at a higher resolution, it is necessary to specify both a horizontal and vertical range.);

and

an output amplifier(T_{out}) connected to the horizontal read portion(X_1, X_2, ...X_{512})

and outputting the pixel signals(figures 6 and 7A, column 15, line 52 through column 16,

line 5).

However, Wilder et al. do not explicitly teach that each pixel has an amplifier, or

that the amplifier of each pixel outputs the pixel signal accumulated by the photodiode.

Koizumi et al. is similar to Wilder et al. in that an MOS device is used(column 1,

lines 21-33) as an image pickup device(column 4, lines 47-54), and photodiodes are

used to convert light into electricity(column 4, lines 55-61). Koizumi et al. also teach

that selection signals are used to read out pixels(column 5, lines 1 and 2).

However, in addition to the teachings of Wilder et al., Koizumi et al. teach that

each pixel(figure 1) has an amplifier(Q3), and that the amplifier(Q3) of each pixel

outputs the pixel signal accumulated by the photodiode(column 4, line 55 through

column 5, line 2).

Therefore, it would have been obvious to a person having ordinary skill in the art

at the time of the invention to connect the individual pixels taught by Wilder et al. to

amplifiers as taught by Koizumi et al. for the benefit of producing a larger, easier to work

with signals, and reducing chip size by integrating the pixels and amplifiers

together(Koizumi et al., column 1, lines 21-33).

Consider claim 10, and as applied to claim 9 above, Wilder et al. further teach:

a memory portion for storing in advance information for determining a region in

the matrix of the pixels to be altered of a density of a signal spacing between the

horizontal or vertical selection signals and a degree of the alteration(A

processor/computer analyzes previous data transmitted(i.e. acts as a memory portion)

from the image sensor to determine(i.e. store in advance) the range in which a

resolution is to be different in the image and a resolution of that range, column 4, lines

57-62. This processor/computer then provides supervisory signals to control the

resolution and range in which the resolution is different(see claim 9 rationale).)

Consider claim 11, and as applied to claim 9 above, Wilder et al. further teach:

the horizontal range specifying circuit and the vertical range specifying circuit are

capable of being changed from the outside dynamically of information for determining a

region in the matrix of the pixels to be altered of a density of a signal spacing between

the horizontal or vertical selection signals and a degree of the alteration("The

supervisory signals may be generated by the processor/computer pursuant to

predetermined pixel readout instructions supplied to the processor/computer through

conventional input devices(i.e. dynamically changed from the outside).").

Consider claim 14, and as applied to claim 9 above, Wilder et al. further teach:

when outputting image signals generated based on the pixel signals read out

from the pixels in the matrix to the outside, the image signals to be output are added

with information for indicating a region where the pixel signals have been read out with

the horizontal or vertical selection signals having altered density of a signal spacing

therebetween and for indicating a resolution in the region(The computer/processor

provides the supervisory signals with address signals(i.e. range and resolution signals)

for the pixels to be read out(see figure 1, "Address and Resolution Level Control",

column 4, line 67 through column 5, line 22). These pixel signals are then read out to

the computer/processor(see figure 1). Because the computer/processor already has

address information for the pixels it then receives from the image sensor, information

expressing the range in which a resolution is to be different in an image and a resolution

of the range are added to the image signals before they are output.).

Consider claim 15, and as applied to claim 9 above, the combination of Wilder et

al. and Koizumi et al. teaches an imaging device(Wilder et al., figure 1) comprising the

MOS solid-state imaging element according to claim 1(Wilder et al., "image sensor", 10,

figure 1, see claim 1 rationale).

Consider claim 17, Wilder et al. teach:

A MOS solid-state imaging element(image sensor, 10, figure 1, column 4, lines

45-48, column 10, line 57 through column 11, line 7) having a photodiode(P.D., figure

5A) for each pixel(figure 5A is a pixel), comprising:

a plurality of the pixels arranged in a matrix(See figure 2);

horizontal read portions(X_1, X_2, ...X_{512}) provided for respective columns of the

pixels(see figure 2), each horizontal read portion(X_1, X_2, ...X_{512}) being connected to

pixels in each column so as to be capable of reading out pixel signals from the pixels in

the respective columns(column 5, lines 25-54);

a horizontal selection circuit(column decoder, 14, figure 2) connected to the

horizontal read portion(X_1, X_2, ...X_{512}) and outputting horizontal selection signals for

selecting, for each column, the pixel signals of pixels to be read out(column 4, line 67

through column 5, line 64);

a vertical selection circuit(row decoder, 12, figure 2) connected to each row of the

pixels(see figure 2) and outputting vertical selection signals for selecting the pixel

signals of pixels to be read out for each row(column 5, lines 23-54);

wherein the horizontal selection signals and the vertical selection signals have an

altered density of a signal spacing therebetween, respectively(See column 6, lines 48-

64. Pixels from a low resolution area of the imager are mixed(column 5, lines 5-22,

column 6, lines 12-44), thereby producing a low signal spacing density. More than one

element per row and/or column are read out at a time(column 6, lines 19-39). As there

is only one signal needed to read out every 2, 4, 8, etc. pixels as one mixed pixel, the

signal spacing density is lowered in the same way as shown by Applicant's "Non-dense"

regions of figure 5. "High-speed data acquisition" can be accomplished by starting the image sensor in a mode wherein one mixed pixel signal is read out for every 64 pixels. A region of interest of the image can be identified and that region can be read out at a higher resolution, with the rest of the imager remaining in a low-resolution state. Therefore, the charges of every pixel would not have to be stored in memory, and thus the memory size requirements are greatly reduced. The method taught in column 6, lines 48-64 of Wilder et al. corresponds to a range specifying portion as a region of interest(i.e. range) is determined. See also, column 4, line 45 through column 6, line 44.).

However, Wilder et al. do not explicitly teach that each pixel has an amplifier, or that the amplifier of each pixel outputs the pixel signal accumulated by the photodiode.

Koizumi et al. is similar to Wilder et al. in that an MOS device is used(column 1, lines 21-33) as an image pickup device(column 4, lines 47-54), and photodiodes are used to convert light into electricity(column 4, lines 55-61). Koizumi et al. also teach that selection signals are used to read out pixels(column 5, lines 1 and 2).

However, in addition to the teachings of Wilder et al., Koizumi et al. teach that each pixel(figure 1) has an amplifier(Q3), and that the amplifier(Q3) of each pixel outputs the pixel signal accumulated by the photodiode(column 4, line 55 through column 5, line 2).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to connect the individual pixels taught by Wilder et al. to amplifiers as taught by Koizumi et al. for the benefit of producing a larger, easier to work

with signals, and reducing chip size by integrating the pixels and amplifiers

together(Koizumi et al., column 1, lines 21-33).

Consider claim 18, and as applied to claim 17 above, Wilder et al. further teach:

a memory portion for storing in advance information for determining a region in

the matrix of the pixels to be altered of a density of a signal spacing between the

horizontal or vertical selection signals and a degree of the alteration(A

processor/computer analyzes previous data transmitted(i.e. acts as a memory portion)

from the image sensor to determine(i.e. store in advance) the range in which a

resolution is to be different in the image and a resolution of that range, column 4, lines

57-62. This processor/computer then provides supervisory signals to control the

resolution and range in which the resolution is different(see claim 17 rationale).).

Consider claim 19, and as applied to claim 17 above, Wilder et al. further teach:

the horizontal range specifying circuit and the .vertical range specifying circuit are

capable of being changed from the outside dynamically of information for determining a

region in the matrix of the pixels to be altered of a density of a signal spacing between

the horizontal or vertical selection signals and a degree of the alteration("The

supervisory signals may be generated by the processor/computer pursuant to

predetermined pixel readout instructions supplied to the processor/computer through

conventional input devices(i.e. dynamically changed from the outside).").

Consider claim 22, and as applied to claim 17 above, Wilder et al. further teach:

when outputting image signals generated based on the pixel signals read out from the pixels in the matrix to the outside, the image signals to be output are added with information for indicating a region where the pixel signals have been read out with the horizontal or vertical selection signals having altered density of a signal spacing therebetween and for indicating a resolution in the region(The computer/processor provides the supervisory signals with address signals(i.e. range and resolution signals) for the pixels to be read out(see figure 1, "Address and Resolution Level Control", column 4, line 67 through column 5, line 22). These pixel signals are then read out to the computer/processor(see figure 1). Because the computer/processor already has address information for the pixels it then receives from the image sensor, information expressing the range in which a resolution is to be different in an image and a resolution of the range are added to the image signals before they are output.).

Consider claim 23, and as applied to claim 17 above, the combination of Wilder et al. and Koizumi et al. teaches an imaging device(Wilder et al., figure 1) comprising the MOS solid-state imaging element according to claim 1(Wilder et al., "image sensor", 10, figure 1, see claim 1 rationale).

10. Claims 4, 12, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wilder et al.(U.S. Patent 5,262,871) in view of Koizumi et al.(U.S. Patent

7,015,964) as applied to claim 1 above, and further in view of Oda et al.(U.S. Patent

6,795,119).

Consider claim 4, and as applied to claim 1 above, Wilder et al. teach of a MOS

solid-state imaging element(see claim 1 rationale). However, the combination of Wilder

et al. and Koizumi et al. does not explicitly teach that the MOS solid-state imaging

element comprises a color filter for each pixel.

Oda et al. is similar to Wilder et al. in that a solid state imaging element is used

as an imager in a digital camera(column 3, line 66 through column 4, line 14). Oda et

al. is also similar in that the solid state imaging element is an MOS imaging element

which utilizes photodiodes to readout signal charges(column 7, lines 52-62).

In addition to the teachings of the combination of Wilder et al. and Koizumi et al.,

Oda et al. teach that the MOS solid-state imaging element(figure 2) comprises a color

filter for each pixel(see figure 2, column 5, lines 44-49).

Therefore, it would have been obvious to a person having ordinary skill in the art

at the time of the invention to include a color filter as taught by Oda et al. with each pixel

taught by the combination of Wilder et al. and Koizumi et al. in order to generate

preliminary information used to perform Automatic Exposure/Automatic focusing, and

realistic live view display on an LCD prior to capturing a desired scene(Oda et al.,

column 1, lines 32-37).

Consider claim 12, and as applied to claim 9 above, Wilder et al. teach of a MOS solid-state imaging element(see claim 9 rationale). However, the combination of Wilder et al. and Koizumi et al. does not explicitly teach that the MOS solid-state imaging element comprises a color filter for each pixel.

Oda et al. is similar to Wilder et al. in that a solid state imaging element is used as an imager in a digital camera(column 3, line 66 through column 4, line 14). Oda et al. is also similar in that the solid state imaging element is an MOS imaging element which utilizes photodiodes to readout signal charges(column 7, lines 52-62).

In addition to the teachings of the combination of Wilder et al. and Koizumi et al., Oda et al. teach that the MOS solid-state imaging element(figure 2) comprises a color filter for each pixel(see figure 2, column 5, lines 44-49).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to include a color filter as taught by Oda et al. with each pixel taught by the combination of Wilder et al. and Koizumi et al. in order to generate preliminary information used to perform Automatic Exposure/Automatic focusing, and realistic live view display on an LCD prior to capturing a desired scene(Oda et al., column 1, lines 32-37).

Consider claim 20, and as applied to claim 17 above, Wilder et al. teach of a MOS solid-state imaging element(see claim 17 rationale). However, the combination of Wilder et al. and Koizumi et al. does not explicitly teach that the MOS solid-state imaging element comprises a color filter for each pixel.

Oda et al. is similar to Wilder et al. in that a solid state imaging element is used

as an imager in a digital camera(column 3, line 66 through column 4, line 14). Oda et

al. is also similar in that the solid state imaging element is an MOS imaging element

which utilizes photodiodes to readout signal charges(column 7, lines 52-62).

In addition to the teachings of the combination of Wilder et al. and Koizumi et al.,

Oda et al. teach that the MOS solid-state imaging element(figure 2) comprises a color

filter for each pixel(see figure 2, column 5, lines 44-49).

Therefore, it would have been obvious to a person having ordinary skill in the art

at the time of the invention to include a color filter as taught by Oda et al. with each pixel

taught by the combination of Wilder et al. and Koizumi et al. in order to generate

preliminary information used to perform Automatic Exposure/Automatic focusing, and

realistic live view display on an LCD prior to capturing a desired scene(Oda et al.,

column 1, lines 32-37).

11.   Claims 5, 13, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Wilder et al. in view of Koizumi et al., further in view of Oda et al. as applied to

claim 4 above, and further in view of Saitoh(U.S. Patent 6,377,304).

Consider claim 5, and as applied to claim 4 above, Wilder et al. teaches of

combining pixel signals in a region of lowered resolution(column 6, lines 30-39).

However, the combination of Wilder et al., Koizumi et al., and Oda et al. does not

explicitly teach that signals having an identical color component are mixed or averaged and then output.

Saitoh is analogous to the combination of Wilder et al., Koizumi et al., and Oda et al. in that Saitoh teaches of an image sensor(figure 12), containing a multitude of pixels(column 16, line 57 through column 17, line 8). Saito also similarly teaches that the image sensor uses MOS technology(column 16, line 57 through column 17, line 61) and that the pixels include color filters(column 17, lines 9-21).

In addition, Saitoh teaches that signals having an identical color component are averaged and then output(Saitoh teaches that two similarly colored pixels are output at a time, effectively averaging the two pixels, column 17, line 62 through column 18, line 29).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to average pixels of a common color as taught by Saitoh in the combined invention of Wilder et al., Koizumi et al, and Oda et al. for the benefit of achieving an improved screen-refresh rate, and an improved readout time when reading out video signals(Saitoh, column 6, lines 6-20).

Consider claim 13, and as applied to claim 12 above, Wilder et al. teaches of combining pixel signals in a region of lowered resolution(column 6, lines 30-39). However, the combination of Wilder et al., Koizumi et al., and Oda et al. does not explicitly teach that signals having an identical color component are mixed or averaged and then output.

Saitoh is analogous to the combination of Wilder et al., Koizumi et al., and Oda et al. in that Saitoh teaches of an image sensor(figure 12), containing a multitude of pixels(column 16, line 57 through column 17, line 8). Saito also similarly teaches that the image sensor uses MOS technology(column 16, line 57 through column 17, line 61) and that the pixels include color filters(column 17, lines 9-21).

In addition, Saitoh teaches that signals having an identical color component are averaged and then output(Saitoh teaches that two similarly colored pixels are output at a time, effectively averaging the two pixels, column 17, line 62 through column 18, line 29).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to average pixels of a common color as taught by Saitoh in the combined invention of Wilder et al., Koizumi et al, and Oda et al. for the benefit of achieving an improved screen-refresh rate, and an improved readout time when reading out video signals(Saitoh, column 6, lines 6-20).

Consider claim 21, and as applied to claim 20 above, Wilder et al. teaches of combining pixel signals in a region of lowered resolution(column 6, lines 30-39). However, the combination of Wilder et al., Koizumi et al., and Oda et al. does not explicitly teach that signals having an identical color component are mixed or averaged and then output.

Saitoh is analogous to the combination of Wilder et al., Koizumi et al., and Oda et al. in that Saitoh teaches of an image sensor(figure 12), containing a multitude of

pixels(column 16, line 57 through column 17, line 8). Saito also similarly teaches that

the image sensor uses MOS technology(column 16, line 57 through column 17, line 61)

and that the pixels include color filters(column 17, lines 9-21).

In addition, Saitoh teaches that signals having an identical color component are

averaged and then output(Saitoh teaches that two similarly colored pixels are output at

a time, effectively averaging the two pixels, column 17, line 62 through column 18, line

29).

Therefore, it would have been obvious to a person having ordinary skill in the art

at the time of the invention to average pixels of a common color as taught by Saitoh in

the combined invention of Wilder et al., Koizumi et al, and Oda et al. for the benefit of

achieving an improved screen-refresh rate, and an improved readout time when reading

out video signals(Saitoh, column 6, lines 6-20).

12.   Claims 8, 16, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Wilder et al.(U.S. Patent 5,262,871) in view of Koizumi et al.(U.S. Patent

7,015,964) as applied to claim 6 above, and further in view of Kondo et al.(U.S. Patent

6,678,405).

Consider claim 8, and as applied to claim 6 above, Wilder et al. teaches of an

imaging device(figure 1) comprising a MOS solid-state imaging element according to

claim 6(10, figure 1, see claim 1 and 6 rationale). Wilder et al. also teaches of reading

out different parts of the imaging element at different resolutions(column 6, lines 45-47,

claim 1 rationale) thereby producing boundaries between different regions having

different resolution. Wilder et al. further teaches of providing addressing

information(see claim 6 rationale). However, Wilder et al. does not explicitly teach of a

filter that executes filter processing at the boundary between regions having different

resolutions, or that the filter portion changes a tap coefficient in conjunction with the

spacing of the density in accordance with the information added to the image signals.

Kondo et al. is similar to Wilder et al. in that Kondo et al. is concerned with

improving processing efficiency(column 1, lines 10-15). Kondo et al. is also similarly is

concerned with image readout including pixel manipulation(column 7, lines 9-40).

However, in addition to the teachings of Wilder et al. and Koizumi et al., Kondo et

al. teach of a filter(figure 1) that executes filter processing(The filter of Kondo et al.

filters pixels in order to obtain optimal blurring, column 7, line 23 through column 8, line

37.), and that the filter portion(figure 1) changes a tap coefficient("prediction coefficient",

column 8, lines 4-10, figure 4) in conjunction with the spacing of the density(The tap

information(i.e. tap coefficient) controls the interval between pixels(i.e. spacing of the

density) constituting the tap to differ depending on the statistical value of the input

image(i.e. based on input image data), column 8, lines 34-37.).

Therefore, it would have been obvious to a person having ordinary skill in the art

at the time of the invention to contain a filter which executes filter processing by

changing a tap coefficient in conjunction with the spacing of the density in accordance

with input image data as taught by Kondo et al. in the imaging device and utilized in the

boundary between different regions having different resolutions taught by the

combination of Wilder et al. and Koizumi et al. for the benefit of creating a higher quality

image with improved features, low noise, and free from blurring(column 1, lines 17-35).

Consider claim 16, and as applied to claim 14 above, Wilder et al. teaches of an

imaging device(figure 1) comprising a MOS solid-state imaging element according to

claim 14(10, figure 1, see claim 9 and 14 rationale). Wilder et al. also teaches of

reading out different parts of the imaging element at different resolutions(column 6, lines

45-47, claim 9 rationale) thereby producing boundaries between different regions having

different resolution. Wilder et al. further teaches of providing addressing

information(see claim 14 rationale). However, Wilder et al. does not explicitly teach of a

filter that executes filter processing at the boundary between regions having different

resolutions, or that the filter portion changes a tap coefficient in conjunction with the

spacing of the density in accordance with the information added to the image signals.

Kondo et al. is similar to Wilder et al. in that Kondo et al. is concerned with

improving processing efficiency(column 1, lines 10-15). Kondo et al. is also similarly is

concerned with image readout including pixel manipulation(column 7, lines 9-40).

However, in addition to the teachings of Wilder et al. and Koizumi et al., Kondo et

al. teach of a filter(figure 1) that executes filter processing(The filter of Kondo et al.

filters pixels in order to obtain optimal blurring, column 7, line 23 through column 8, line

37.), and that the filter portion(figure 1) changes a tap coefficient("prediction coefficient",

column 8, lines 4-10, figure 4) in conjunction with the spacing of the density(The tap

information(i.e. tap coefficient) controls the interval between pixels(i.e. spacing of the

density) constituting the tap to differ depending on the statistical value of the input

image(i.e. based on input image data), column 8, lines 34-37.).

Therefore, it would have been obvious to a person having ordinary skill in the art

at the time of the invention to contain a filter which executes filter processing by

changing a tap coefficient in conjunction with the spacing of the density in accordance

with input image data as taught by Kondo et al. in the imaging device and utilized in the

boundary between different regions having different resolutions taught by the

combination of Wilder et al. and Koizumi et al. for the benefit of creating a higher quality

image with improved features, low noise, and free from blurring(column 1, lines 17-35).

Consider claim 24, and as applied to claim 22 above, Wilder et al. teaches of an

imaging device(figure 1) comprising a MOS solid-state imaging element according to

claim 22(10, figure 1, see claim 17 and 22 rationale). Wilder et al. also teaches of

reading out different parts of the imaging element at different resolutions(column 6, lines

45-47, claim 17 rationale) thereby producing boundaries between different regions

having different resolution. Wilder et al. further teaches of providing addressing

information(see claim 22 rationale). However, Wilder et al. does not explicitly teach of a

filter that executes filter processing at the boundary between regions having different

resolutions, or that the filter portion changes a tap coefficient in conjunction with the

spacing of the density in accordance with the information added to the image signals.

Kondo et al. is similar to Wilder et al. in that Kondo et al. is concerned with

improving processing efficiency(column 1, lines 10-15). Kondo et al. is also similarly is

concerned with image readout including pixel manipulation(column 7, lines 9-40).

However, in addition to the teachings of Wilder et al. and Koizumi et al., Kondo et

al. teach of a filter(figure 1) that executes filter processing(The filter of Kondo et al.

filters pixels in order to obtain optimal blurring, column 7, line 23 through column 8, line

37.), and that the filter portion(figure 1) changes a tap coefficient("prediction coefficient",

column 8, lines 4-10, figure 4) in conjunction with the spacing of the density(The tap

information(i.e. tap coefficient) controls the interval between pixels(i.e. spacing of the

density) constituting the tap to differ depending on the statistical value of the input

image(i.e. based on input image data), column 8, lines 34-37.).

Therefore, it would have been obvious to a person having ordinary skill in the art

at the time of the invention to contain a filter which executes filter processing by

changing a tap coefficient in conjunction with the spacing of the density in accordance

with input image data as taught by Kondo et al. in the imaging device and utilized in the

boundary between different regions having different resolutions taught by the

combination of Wilder et al. and Koizumi et al. for the benefit of creating a higher quality

image with improved features, low noise, and free from blurring(column 1, lines 17-35).

Conclusion

13.   The prior art made of record and not relied upon is considered pertinent to

applicant's disclosure. Roberts(US 5,452,004) teaches of performing a windowing

operation(figure 6) in which pixels in windows(172 and 174) are scanned more frequently than the rest of the pixels in the array(column 10, lines 36-49). Terada et al.(US 6,124,888) teach of performing pixel readout of a sensor by skipping selection signals(column 14, lines 33-51), and of thinning pixels in a multicolored array by combining pixels of the same color(figures 27A and 27B, column 26, line 40 through column 28, line 31).

14.   **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Albert H. Cutler whose telephone number is (571)-270-1460. The examiner can normally be reached on Mon-Fri (7:30-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Ngoc-Yen Vu can be reached on (571)-272-7320. The fax phone number

for the organization where this application or proceeding is assigned is 571-273-8300.

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USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AC .

NGOC-YEN VU
SUPERVISORY PATENT EXAMINER